

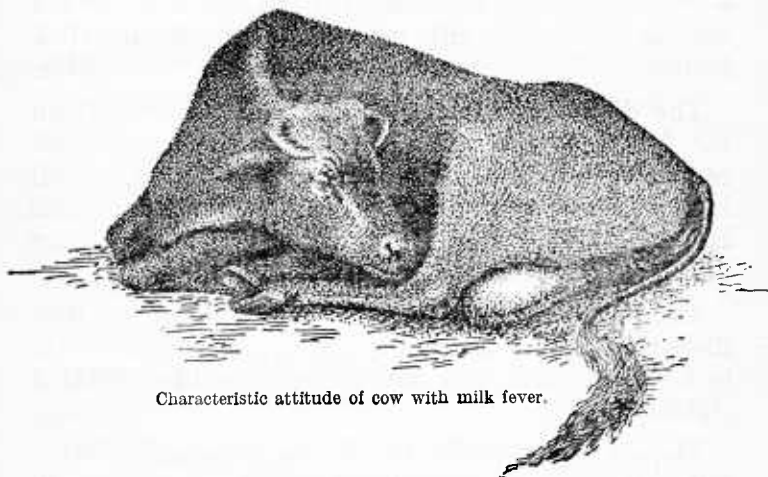
Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

MILK FEVER: ITS SIMPLE AND SUCCESSFUL TREATMENT

JOHN R. MOHLER

Chief of the Bureau of Animal Industry



Characteristic attitude of cow with milk fever.

FARMERS' BULLETIN 206
UNITED STATES DEPARTMENT OF AGRICULTURE

Contribution from the Bureau of Animal Industry
JOHN R. MOHLER, Chief

Washington, D. C.

Revised March, 1918

Show this bulletin to a neighbor. Additional copies may be obtained free from the
Division of Publications, United States Department of Agriculture

MILK FEVER is a disease affecting cows as a rule shortly after calving. Other farm animals are seldom or never affected. Well-fed, or overfed, heavy-milking dairy cows are especially susceptible.

The disease generally attacks mature cows, from the fourth to the sixth calf. One attack does not render the animal immune. In fact such an animal is more liable to a future attack. While the disease is more likely to occur after an easy calving, it may also follow a case of difficult parturition.

The direct cause of milk fever is unknown. Pre-disposing causes are heavy feeding combined with lack of exercise and confinement in ill-ventilated stables.

The air treatment for the disease is not only simple but is the most successful yet found. It consists in injecting sterilized air into the udder by means of an apparatus which can be procured and operated by the dairyman or farmer, although it is always safer to procure the services of a skilled veterinarian.

MILK FEVER:

ITS SIMPLE AND SUCCESSFUL TREATMENT.

CONTENTS.

Preliminary remarks-----	3	Appearance after death-----	6
Description of disease-----	4	Mortality-----	7
Predisposition and cause-----	4	Treatment-----	7
Symptoms-----	5	Prevention-----	11

PRELIMINARY REMARKS.

MILK FEVER is a very common, and was formerly a frequently fatal, disease affecting cows in all the large dairy districts of this and other countries. As it usually attacks the best milking members of the herd and at a time when the milk flow is the heaviest, the malady is one which may cause severe losses to our dairy industry unless properly treated. It is therefore of the greatest economic importance that every milk producer acquaint himself with the present extremely successful methods of treating this disease, especially the injection of filtered atmospheric air into the udder. In view of the uniform success that has followed this form of treatment, every dairyman should become familiar with its use and should provide himself with a suitable apparatus for its application, especially if he is located where the services of a competent veterinarian can not be obtained. This method of dealing with the disease does not make the assistance of the veterinarian undesirable, in case it is obtainable, as the professional man may frequently be of the greatest assistance in treating complicated symptoms, should they arise.

The common name for this malady—milk fever—is an erroneous and misleading one, as in reality fever is usually absent; instead, there is generally an actual reduction in body temperature. A far better and more distinctive term and one that describes the actual condition much more precisely is parturient paresis, signifying a paralysis incident to calving. The disease is known also by several other names in various parts of the country, such as calving fever, parturient fever, parturient apoplexy, parturient collapse, puerperal fever, vitulary fever, and dropping after calving.

DESCRIPTION OF DISEASE.

Milk fever is a disease of well-nourished, fleshy, heavy-milking cows; it occurs during the most active period of life (fourth to sixth calf), and is characterized by its sudden onset and the complete paralysis of the animal with loss of sensation. It generally follows closely the act of calving, or parturition, and terminates in a short time either in recovery or death. One attack predisposes the animal to a recurrence of the trouble. While this disease may occur at any time during the whole year, it is seen principally during the warm summer season. The affection is almost entirely confined to the cow, although a few cases have been reported in the sow and goat. Sheep are entirely free from the disease.

PREDISPOSITION AND CAUSE.

There are few diseases among our domesticated animals regarding the exact cause of which more widely different theories have been advanced than that of milk fever. The causes may properly be divided into two kinds—predisposing and direct. Experience shows one of the most prominent predisposing causes to be the great activity of the milk-secreting structure, namely, the udder. This organ is most active after the fourth, fifth, and sixth parturition, and this is the time of life when the vast majority of cases occur. The disease is almost unknown in heifers with the first calf and decreases in frequency steadily after the most active milking period is past. It is rarely, if ever, met with in pure beef breeds, such as the Shorthorn, Angus, and Hereford, while its main inroads are made into the heavy-milking breeds, such as the Holstein, Jersey, and Guernsey. Another factor that is probably of equal importance with the activity of the udder in producing the disease is the existence of a condition of the system resulting from excessive feeding and lack of exercise before calving. In heavy-milking cows all the feed eaten in excess of that required to make up for the normal waste of the system is turned into milk and not used for the laying on of flesh or fat. Fleshiness is therefore an unnatural condition in these animals, and the period during which they are “dry” is usually very short; indeed, many of these cows continue to secrete milk right up to the time of calving. In those cases where the animals go dry the excess of nutriment in the food has no avenue of escape and immediately becomes stored up in the glands and in the blood, throwing the system into a high state of plethora. Now, at the time of calving all the blood which has been supplying the fetus is suddenly thrown back on the circulation, and if the udder does not begin active secretion very promptly plethora becomes extreme. The blood plasma under these conditions is very rich and dense, containing a large percentage of albumen and glyco-

gen, and causing a shrinkage in size of the blood cells. This condition is invariably seen when the blood of a cow suffering from milk fever is examined under the microscope.

Fatness of the animal has been ascribed an important place among the causes of milk fever. This, however, in itself is probably not a predisposing cause. The beef breeds (Angus, Hereford, and Short-horn) are usually in far better condition at the time of calving than the milking breeds (Jersey and Holstein), and yet milk fever is a rarity in the former. At the same time it must be understood that a fat Jersey is more predisposed than one poor in flesh. In the fat Jersey the system is already loaded with an excess of nutriment, and at the time of calving extreme plethora is more readily produced than in the thin animal, where the excess of nutritive elements could be more readily used and stored in the depleted muscular and glandular structures of the body. Fatness is therefore only of importance in the production of the disease in so far as it tends to increase glandular activity, particularly of the udder, and because of the higher state of plethora of the fat animal.

Regarding the direct cause of milk fever numerous theories have been advanced by various investigators, but only to be abandoned as further discoveries in pathology were made.

SYMPTOMS.

This disease in its typical and most common form is comparatively easy to diagnose and one which almost every dairyman knows immediately before the arrival of the veterinarian. It usually comes on within two days after the birth of the calf and is practically never seen after the second week. In isolated instances it has been observed a few days before calving. At the commencement of the attack there is usually excitement; the cow is restless, treads with the hind feet, switches the tail, stares anxiously around the stall or walks about uneasily. She may bellow occasionally, show slight colicky symptoms, and make ineffectual attempts at relieving the bowels. These symptoms are rarely recognized by the owner, but they are followed within a few hours by beginning paralysis, indicated by a staggering gait, especially in the hind legs, and by weakening of the knees and fetlocks in front. The patient now becomes quieter, the gait more staggering and weak, and finally the animal goes down and is unable to rise. The paralysis by this time is general, the calf is unnoticed, and the cow lies perfectly quiet with the eyes partly closed and staring and showing a complete absence of winking when the eyeball is touched. She is absolutely unheeding of her surroundings and flies may alight with impunity on all parts of the body without causing the slightest movement to dislodge them. While down the

patient assumes a very characteristic position (see illustration on front page), which is of great aid in diagnosis. The head is turned to the side (usually the left) and rests on the chest, causing a peculiar arching of the neck. If the head is drawn out straight, it immediately flops around to the side again when the force is removed. The body usually rests slightly to one side, with the hind legs extended forward and outward and the forelegs doubled up in their normal position. There is paralysis of the muscles of the throat, so that swallowing is impossible, and in case drenching is attempted there is great danger of the fluids going into the lungs and setting up pneumonia. Paralysis of the rectum and bladder is also complete and the movement of the intestines is so suppressed that purgatives are frequently powerless to reestablish it. Fermentation in the paunch with consequent bloating is sometimes seen, particularly when the patient is allowed to be stretched out on her side. The secretion of milk is diminished and may be suspended entirely. Sugar is voided in the urine, depending in quantity on the severity of the attack. The pulse is weak and at times hardly perceptible to the finger, averaging from 50 to 70 beats per minute. Later in the disease, however, and especially in those cases with unfavorable terminations, it may reach 100 per minute. There is seldom noticed a rise of temperature. Sometimes at the commencement of the attack the temperature may reach 103° F., but there is a steady decrease to as low as 95° F. as the disease progresses. The temperature rapidly rises again as improvement is manifested. Convalescence occurs rapidly. On the day following the onset of the disease, and in some cases even within a few hours, the animal may be up eating and drinking in a normal manner. Sometimes, however, a slight paralysis of the hind quarters persists, and may remain for a week or even longer, indicating that some structural change must have occurred in the nerve centers.

In fatal cases the animal may remain perfectly quiet and die in a comatose condition from complete paralysis of the nervous system, but more frequently there is some agitation and excitement prior to death with tossing about of the head. Death, like recovery, usually occurs in from 18 to 72 hours after the onset of the malady.

APPEARANCE AFTER DEATH.

The post-mortem appearances in an animal dead of this disease are frequently entirely negative and not in the slightest degree characteristic. This further upholds the theory that milk fever is an intoxication and not a bacterial infection, as in the latter case the lesions would be more marked and distinguishable. The post-mortem also fails to substantiate the fermentation theory (womb), as the uterus is generally found contracted and its mucous membrane intact. The third

stomach is sometimes found impacted with dry, hard masses of food, and there may be some fermentation in the intestines. Sugar in varying percentage is always found in the urine in the bladder as well as in that drawn prior to death. Various particles of food may be found in the larynx, together with congestion and swelling of the mucous membrane of the trachea and bronchi. Pneumonia, traumatic in origin, may also be observed if drenching has been attempted after paralysis of the throat has occurred. The blood usually appears dark and thick and congestion of the spinal cord and of the base of the brain is also quite frequently present.

MORTALITY.

Prior to the introduction of the treatment by injection of the udder, milk fever was considered an exceedingly serious malady and the death rate was placed by various authors at 40 to 50 and even 70 per cent. However, after the introduction and general application of potassium-iodid injections into the udder, the mortality was greatly reduced. Since the use of sterile atmospheric air for the injection of the udder, the death rate is even much lower than with the potassium-iodid treatment. Statistics taken of 914 cases showed that over 96 per cent recovered. In general, the nearer the attack follows the act of calving, the more severe it proves and the graver the danger. The severity also greatly increases with each subsequent attack.

TREATMENT.

Of all known methods of treating milk fever the injection of sterile atmospheric air into the udder is by far the most simple and practicable as well as the most efficacious and harmless one at our disposal, and only occasionally requires that medicinal treatment be given.

The method of injecting filtered air into the udder is easy of manipulation, requires but little time, and is readily accomplished by means of milk-fever apparatus, such as is illustrated in figure 1.¹ It consists of a metal cylinder *f* with milled screw-cap *c* and *d* on either end. Cap *c* may be removed in order to place sterile absorbent cotton within the chamber. To this cap the rubber bellows *a* and *b* are connected by 9 inches of rubber tubing. Cap *d* is to be removed together with the attached 18 inches of rubber hose, at the free end of which is the self-retaining milking tube *g*, for the purpose of disinfection before treating each case. The pulling on or off of the tubing on the nozzles of the milled caps is thus rendered unnecessary. Within the metal cylinder at *e* is a wire net, which prevents the

¹ Persons desiring the name and address of firms manufacturing milk-fever outfits will be furnished with such information upon application to the Chief of the Bureau of Animal Industry.

obstruction of the outlet of the chamber by holding back the sterile cotton, and also permits of the unscrewing of the lower cap and the disinfection of this portion of the apparatus, including the milking tube, without contaminating the packing. Absorbent cotton impregnated with carbolic acid (carbolized cotton) or other suitable disinfectant can be purchased from the drug trade in most localities, and is better, though slightly more expensive, than the plain cotton.

Just before making the air injection, the hands of the operator should be thoroughly cleansed and a clean towel placed under the udder to prevent the teats from coming in contact with dirt or filth of any kind. Soap and water should then be applied to the teats and udder, after which they should be carefully disinfected with a 5 per cent solution of carbolic acid (3 tablespoonfuls of pure carbolic acid to 1 quart of water). The milking tube, before it is placed in the teat, should have been perfectly sterilized by boiling for 15 minutes, with the lower hose and cap of the cylinder attached, and the apparatus should be wrapped in a clean towel, without touching the milking tube, to prevent contamination before use. If the apparatus has been subjected to this treatment shortly before and it is desired to disinfect only the milking tube, the latter may be placed in a 5 per cent solution of carbolic acid for five minutes. It is then carefully inserted into the milk duct of the teat without emptying the udder of milk. Air is now pumped from the bulb *a* into the reservoir *b*, and thus a continuous flow of air is forced through the filtering chamber and into the udder. Slight massage or kneading of the udder will cause the innermost recesses of the milk tubules to become distended with the injected air. After one-quarter of the udder is well distended the milking tube is removed, care being taken to prevent the outflow of air by having an assistant tie a broad piece of tape about the teat at the time the milking tube is withdrawn. The same treatment is repeated with the other three teats until the udder is satisfactorily distended. In case the air becomes absorbed and no improvement is noted within five hours, a repetition of this treatment should be made under the same antiseptic precautions as at first. The tape should be removed from the teats two or three hours after the cow gets on her feet, the constricting muscles at the tip of the teats being now depended on for retaining the air. In this manner the air may be left in the udder for 24 hours, and when recovery is assured, it should be gradually milked out. It is needless to say that the calf should not be permitted to suck during this period.

Inflammation of the udder (caked bag) is avoided if the milking tube is thoroughly disinfected before each application, and if the cow's teats and bag and the hands of the operator have been properly cleansed. If the apparatus is kept in its case free from dust and dirt,

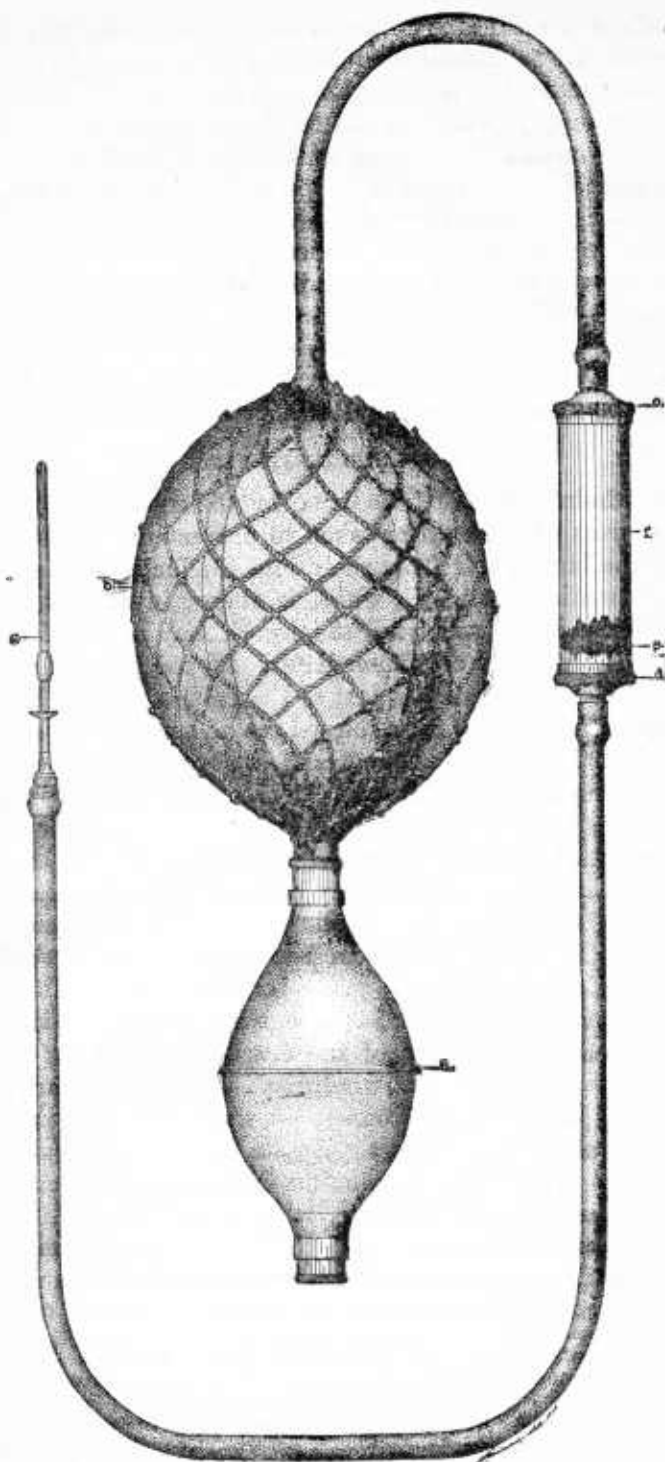


FIG. 1.—Apparatus for injecting sterile atmospheric air into the udder.

the absorbent or medicated cotton in the metal cylinder will efficiently filter enough air to distend the udders of six cows. After this number has been treated it is advisable to replace the old cotton with a fresh sterile supply, which should be placed loosely in the cylinder.¹

While this method of treating milk fever is a comparatively easy one for a farmer or dairyman to adopt, he can not expect to have the same successful results as those obtained by a skilled veterinarian, and it is therefore advisable that the services of such a veterinarian should always be obtained in those districts where it is possible. In many cases it will be found that the injection of air into the udder will be sufficient to combat the disease without any other treatment, but it is always advisable to study the symptoms of each individual case and administer in a rational manner the indicated medicines.

MEDICINAL TREATMENT.

In the administration of medicine by the mouth, and especially drenches, great care should be taken to prevent the fluids from getting into the larynx and from there into the lungs, where they will set up traumatic pneumonia, which is almost invariably fatal. In case the throat is not paralyzed the drench may prove of value and should be given slowly and immediately stopped at the first sign of uneasiness or coughing on the part of the animal. While the patient lies on the side she must raise the weight of her body at each inspiration, which is very exhausting, and hypostatic congestion of the dependent lung is greatly favored. Consequently it is of importance that the cow should be kept propped up on the breastbone by means of bags of chaff or straw placed against her side. In the way of medicinal treatment purgatives may be given in the first stage of the disease when the animal can swallow, with the precautions above mentioned. One pound of Epsom salt and 2 ounces of creolin dissolved in a pint of water will prove beneficial. The latter drug is added for its antiseptic action to prevent fermentation in the paunch with the consequent danger of the eructation of foods and their subsequent passage into the windpipe. Ammonium carbonate in 2-dram doses dissolved in 2 ounces of water will be found to act equally as well in this respect. Epsom salt is rather slow in its action, and an injection under the skin with a hypodermic syringe of $1\frac{1}{2}$ to 2 grains of eserine sulphate, when obtainable, will be found quicker and more efficacious. The rectum should be emptied and injections of 1 to 2 gallons of warm water given to stimulate intestinal movements. However, the normal movement of the bowels,

¹A number of bacteriological tests were made in order to determine the efficiency of the absorbent cotton in the cylinder to filter out the microorganisms from the atmospheric air. For this purpose agar plates and slant agar tubes were used and the results obtained proved the absolute certainty of this quality of cotton filtering successfully a sufficient volume of air to distend six good-sized udders.

once lost, is exceedingly hard to reestablish, and sometimes all efforts in that direction fail. The urine should be drawn with a catheter or by pressure on the bladder with the hand in the rectum, as the bladder is paralyzed and unable to empty itself.

The feeble pulse and subnormal temperature call for the administration of stimulants. Injections under the skin of 1 dram of the following solution every three hours are probably the most efficacious: 80 grains of caffeine, 60 grains of sodium salicylate, and 4 drams of water. Similar injections of 1 grain of strychnia sulphate three times daily will also be found very beneficial. In case the animal is very excitable the head should be restrained in such a manner as to prevent injury, and, in case the violence becomes excessive, 1½ ounces of chloral dissolved in a quart of water may be injected into the rectum, or 5 grains of morphin sulphate under the skin.

PREVENTION.

Since the treatment of the present day has so greatly reduced, and even in some cases obliterated, the mortality, prevention is not an important problem and therefore preventive measures which have a severe and lasting effect upon the animals should be abandoned from an economic standpoint. It has long been advocated to starve all suspected animals for two weeks prior to the birth of the calf. It is frequently noted that this has an injurious effect on the milk flow of the animal, from which it may require several weeks for her to recover and gain her normal output of milk. This measure is not advisable, as it is better to have cows attacked with the disease once in a while (the mortality being less than 5 per cent) than to decrease the flow from every heavy-milking cow for one to three weeks after she comes fresh by starving her before calving.

A method which is not quite so sure of reducing the plethoric condition of the cow, but which nevertheless proves very efficient and is without the slightest permanent injurious effect, is the administration of 1 to 1½ pounds of Epsom salt two or three days prior to calving. In case this has been neglected and a well-nourished, heavy-milking cow has passed through an easy, nonexhausting calf birth, the administration of the salt after the labor is over should by no means be neglected. Bloodletting also has been advocated, but there is always the danger of exciting the blood-making organs to excessive activity, thus largely neutralizing the effect.

A very good preventive measure, and one easily carried out, though frequently overlooked, is to give the cow plenty of exercise up to the time of calving. Many animals are allowed to run continuously on pastures from the time they go dry until a week or two before calving, when they are transferred to the stable without any subsequent

exercise. This is very conducive to the enriching of the blood and the development of the disease.

The most recent preventive treatment suggested is in line with the favorable results obtained by the injection of air into the udder. It consists in allowing the susceptible cow to retain in the udder for 24 hours after calving all the milk except the small quantity required by the calf, which should be taken if possible from each quarter. The distention of the udder naturally follows as in the air treatment and acts as a preventive against milk fever. In the Island of Jersey and at the Biltmore Farms, N. C., where this practice is common, the number of milk fever cases has been greatly lessened. General sanitary conditions also should be looked after, such as the supply of pure air and clean stabling, with plenty of clear, cool water and laxative feeds, such as grasses and roots.



